

Features

- AEC-Q101 Qualified
- High breakdown voltage to 1200V for improved reliability
- Maximum Junction Temperature 150°C
- Positive Temperature Coefficient
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant (Note 2) ("P" Suffix)
- Designates RoHS Compliant. See Ordering Information)

Applications

- PTC heater

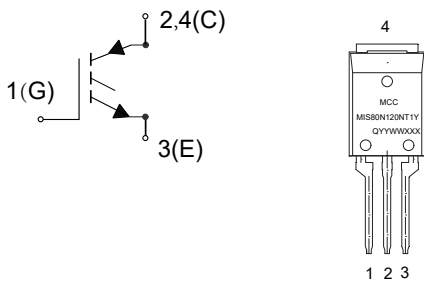
Maximum Ratings

Parameter	Symbol	Rating	Unit
Collector-Emitter Voltage	V_{CE}	1200	V
DC Collector Current, Limited by T_{Jmax} .	I_C	$T_C=25^\circ C$ 145 ^(Note3)	A
		$T_C=100^\circ C$ 80	
Pulsed Collector Current ^(Note 4)	$I_{C,pluse}$	240	A
Turn off Safe Operating Area $V_{CE} \leq 1200V, T_j \leq 150^\circ C$		240	A
Continuous Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ^(Note 5)		± 30	
Power Dissipation	P_D	$T_C=25^\circ C$ 735	W
		$T_C=100^\circ C$ 294	

Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <100ppm antimony compounds.
2. High Temperature Solder Exemptions Applied, see EU Directive Annex 7a.
3. Bond wire current limit is 80A.
4. $V_{GE}=15V, T_p$ limited by T_{Jmax} .
5. $T_p \leq 10\mu s, D < 0.010$.

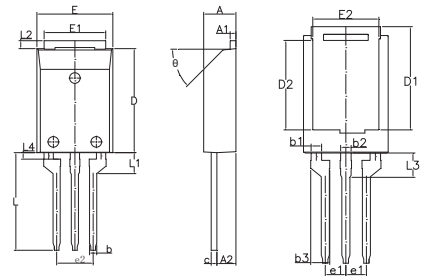
Internal Structure



Device Code: MIS80N120NT1Y
Date & Trace Code : QYYWXXXX

Trench and Field Stop IGBT 1200V 80A

STO-220



DIM	DIMENSIONS				NOTE
	INCHES		mm		
A	0.171	0.187	4.34	4.74	
A1	0.028	0.039	0.70	1.00	
A2	0.098	0.118	2.50	3.00	
b	0.028	0.051	0.70	1.30	
b1	0.049	0.065	1.25	1.65	
b2	0.049	0.065	1.25	1.65	
b3	0.085	0.093	2.16	2.36	
c	0.028	0.039	0.70	1.00	
D	0.551	0.591	14.00	15.00	
D1	0.492	0.531	12.50	13.50	
D2	0.415	0.454	10.54	11.54	
E	0.394	0.433	10.00	11.00	
E1	0.315	0.354	8.00	9.00	
E2	0.303	0.343	7.70	8.70	
e1	0.100		2.55		TYP.
e2	0.193	0.209	4.90	5.30	
L	0.512	0.571	13.00	14.50	
L1	0.104	0.124	2.65	3.15	
L2	0.020	0.059	0.50	1.50	
L3	0.108	0.128	2.75	3.25	
L4	-	0.059	-	1.50	
θ	42.50°	47.50°	42.50°	47.50°	

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
IGBT Static Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CES}$	$V_{GE}=0V, I_C=250\mu A$	1200			V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$V_{GE}=15V, I_C=33A, T_J=25^\circ C$		1.35	1.65	V
		$V_{GE}=15V, I_C=33A, T_J=125^\circ C$		1.48		
		$V_{GE}=15V, I_C=33A, T_J=150^\circ C$		1.55		
		$V_{GE}=15V, I_C=80A, T_J=25^\circ C$		1.75	2.3	
		$V_{GE}=15V, I_C=80A, T_J=125^\circ C$		2.15		
		$V_{GE}=15V, I_C=80A, T_J=150^\circ C$		2.25		
G-E Threshold Voltage	$V_{GE(th)}$	$I_C=2.60mA, V_{CE}=V_{GE}$	5.35	6.0	6.7	V
C-E Leakage Current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_J=25^\circ C$			0.25	mA
		$V_{CE}=1200V, V_{GE}=0V, T_J=150^\circ C$			1.00	
G-E Leakage Current	I_{GES}	$V_{CE}=0V, V_{GE}=\pm 20V$			100	nA
Dynamic Characteristics						
Input Capacitance	C_{ies}	$V_{CE}=25V, V_{GE}=0V, f=1MHz$		7.94		nF
Reverse Transfer Capacitance	C_{res}			0.19		
Gate Charge	Q_g	$V_{CC}=960V, I_C=80A, V_{GE}=15V$		0.65		μC

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
IGBT Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=80A,$ $V_{GE}=-5V/+15V, R_G=10\Omega, T_J=25^\circ C$ Inductive Load		33		ns
Rise Time	t_r			85		
Turn-Off Delay Time	$t_{d(off)}$			231		
Fall Time	t_f			174		
Turn-On Energy	E_{on}			7.5		mJ
Turn-Off Energy	E_{off}			4.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=80A,$ $V_{GE}=-5V/+15V, R_G=10\Omega, T_J=125^\circ C$ Inductive Load		30		ns
Rise Time	t_r			79		
Turn-Off Delay Time	$t_{d(off)}$			243		
Fall Time	t_f			263		
Turn-On Energy	E_{on}			7.8		mJ
Turn-Off Energy	E_{off}			5.5		
Turn-On Delay Time	$t_{d(on)}$	$V_{CC}=600V, I_C=80A,$ $V_{GE}=-5V/+15V, R_G=10\Omega, T_J=150^\circ C$ Inductive Load		28		ns
Rise Time	t_r			74		
Turn-Off Delay Time	$t_{d(off)}$			252		
Fall Time	t_f			325		
Turn-On Energy	E_{on}			8.0		mJ
Turn-Off Energy	E_{off}			6.2		

Parameter	Symbol	Min	Typ	Max	Units
Operating Junction Temperature Range	T_J	-40		150	$^\circ C$
Storage Temperature Range	T_{stg}	-55		150	$^\circ C$
Thermal Resistance from Junction to Case (IGBT)	R_{thJ-C}			0.17	$^\circ C/W$
Thermal Resistance from Junction to Ambient	R_{thJ-A}			62	$^\circ C/W$

Curve Characteristics

Fig. 1 - Typical Output Characteristic($T_j=25^\circ\text{C}$)

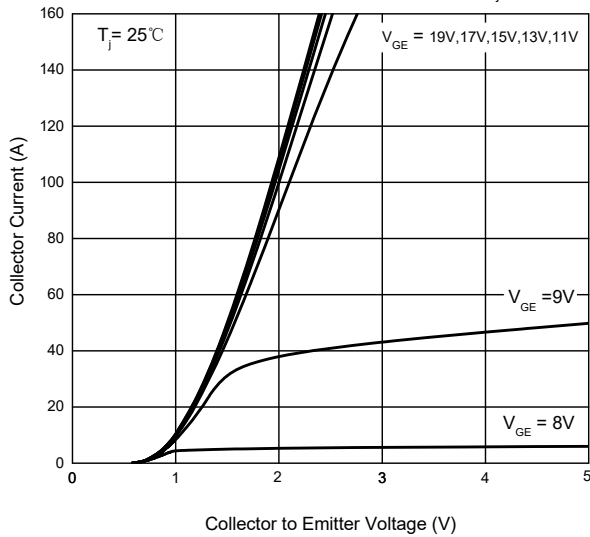


Fig. 2 - Typical Output Characteristic ($T_j=150^\circ\text{C}$)

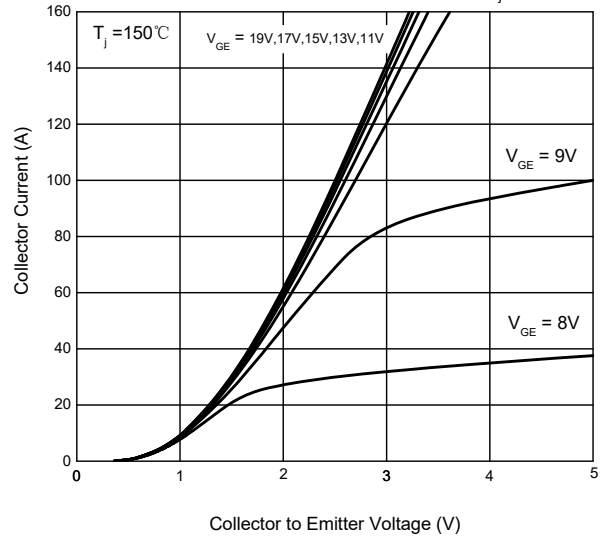


Fig. 3 - Typical Transfer Characteristic

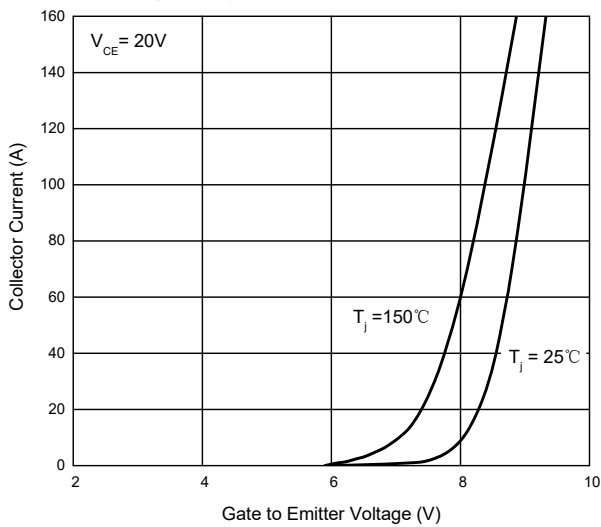


Fig. 4- Capacitance Characteristics

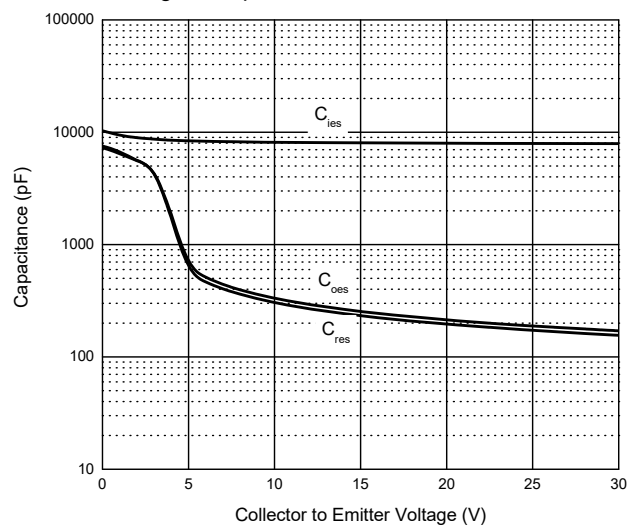


Fig. 7 - IGBT Switching Loss vs. I_c

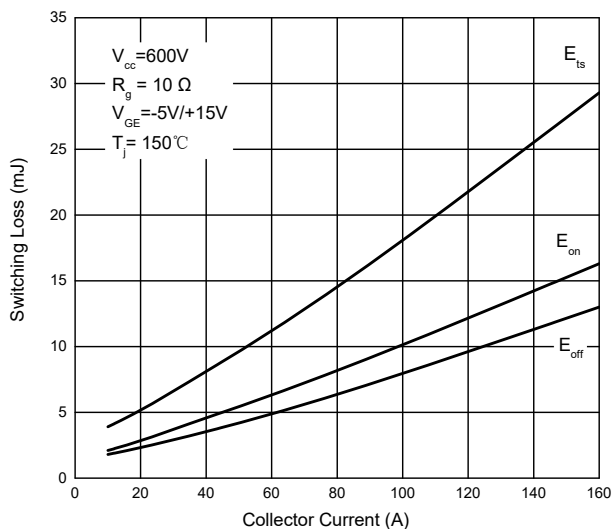
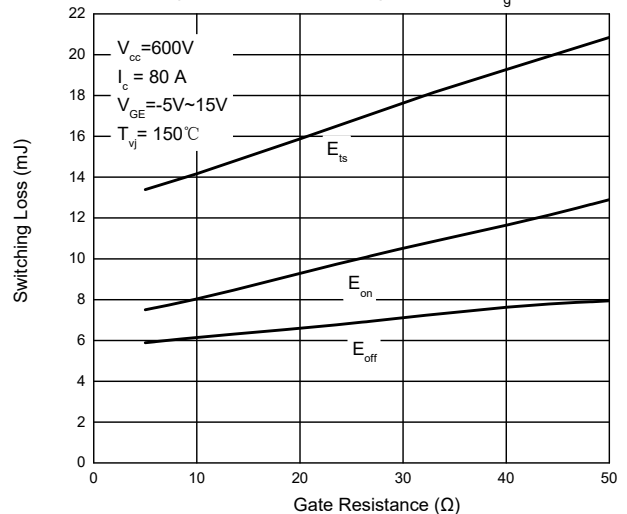


Fig. 8- IGBT Switching Loss vs. R_g



Curve Characteristics

Fig. 7- Switching Times vs. Collect Current

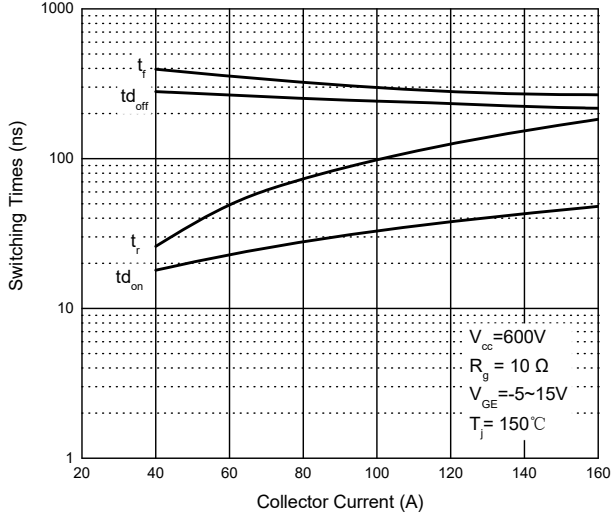


Fig. 8 - Switching Times vs Gate Resistance

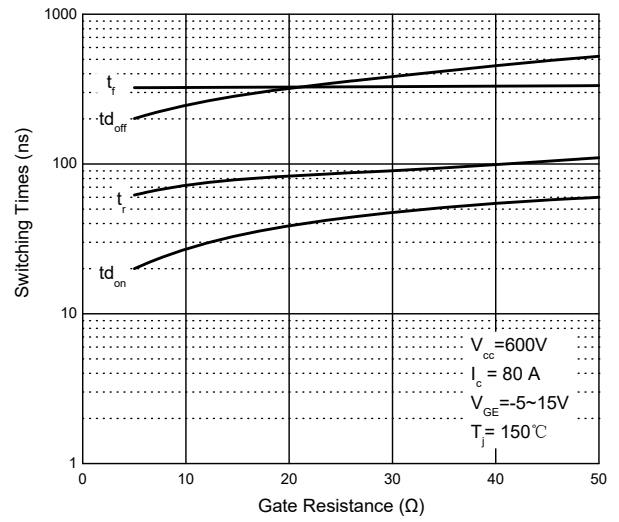


Fig. 9- $V_{GE(th)}$ vs. Junction Temperature

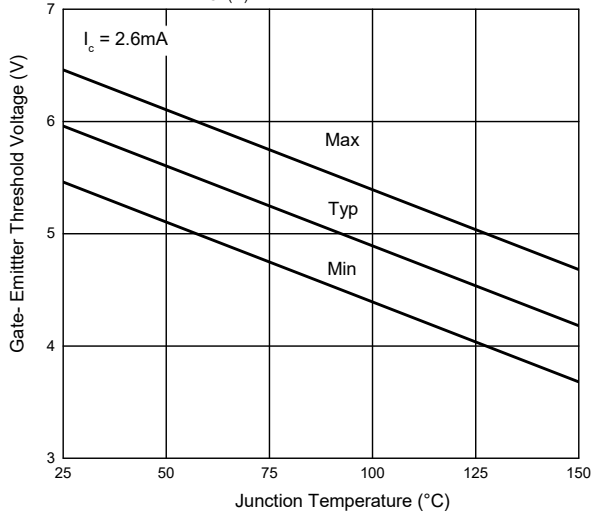


Fig. 10 -FBSOA

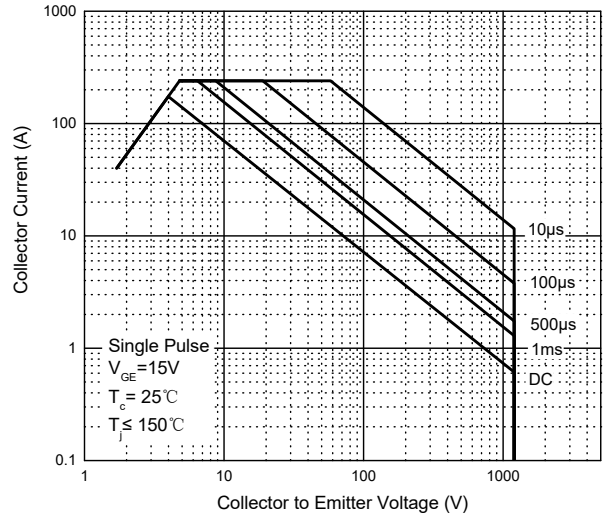


Fig. 11 - Collector Current vs. Case Temperature

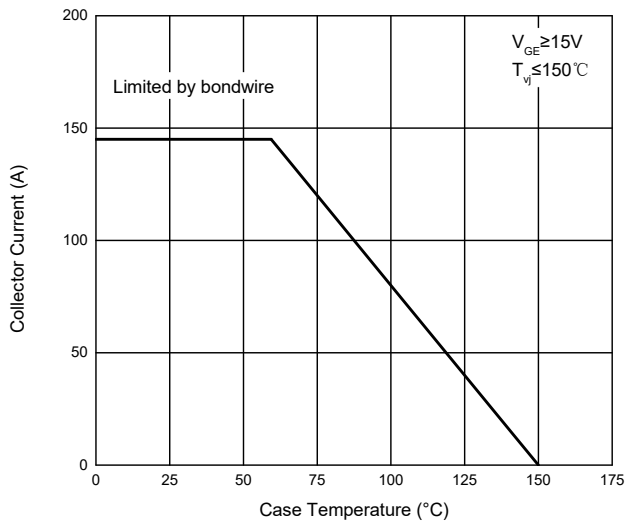
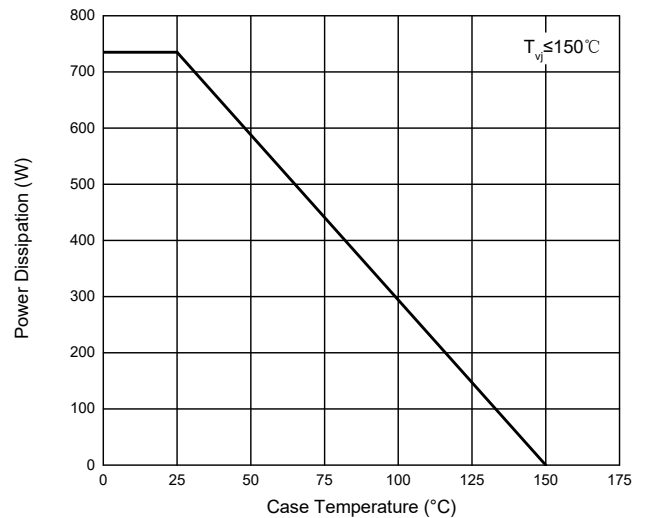
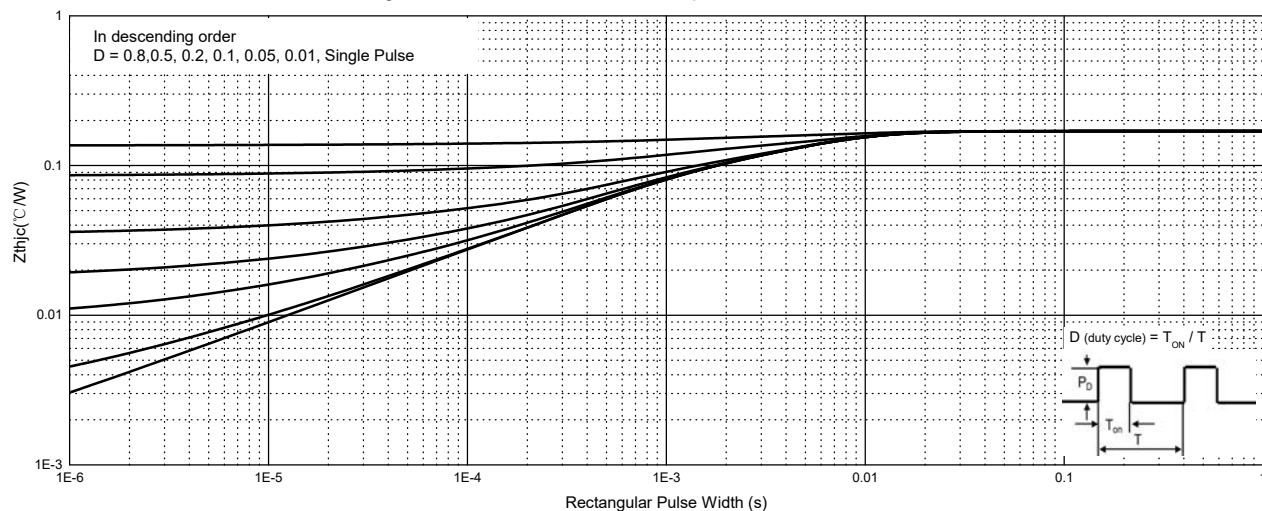


Fig. 12 - Power Derating



Curve Characteristics

Fig.13 -IGBT Transient Thermal Impedance



Ordering Information

Device	Packing
Part Number-BP	Bulk:50pcs/Tube, 1Kpcs/Box, 5Kpcs/Carton

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